
New York State Woodland Owners and Their Interest in Woody Biofuels



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EXECUTIVE SUMMARY

In an attempt to better understand potential constraints on woody biofuel production in New York state, Human Dimension Research Unit (HDRU) researchers teamed with Cornell Cooperative Extension personnel to study three audiences involved in supplying woody biofuels – landowners, foresters, and loggers. Knowing the constraints faced by these three groups will help to develop educational programs that guide the decisions of owners and producers in sustainable and renewable energy enterprises.

This report focuses on private woodland owners, with the specific objective of assessing woodland owner awareness and knowledge of woody biofuels, and their potential willingness to participate in biofuel production. Results will foster development and dissemination of educational resources that help woodland owners, foresters, loggers and policy makers make decisions about their involvement in the woody biofuel market.

A mail questionnaire was developed and sent to 2,400 New York State woodland owners in the fall of 2010. In the questionnaire, woody biofuels were defined for woodland owners as firewood, low quality logs, wood pellets, chips, etc. that can be used to heat homes or provide energy for businesses. They were told that these woody biofuels could come from their land directly as a result of cutting trees or from thinning a woodland. The sample was drawn randomly from the 2009 Assessment Rolls for New York State of parcels with 25 acres or more and property classifications that identified the land as likely wooded and not in public or industrial ownership. We chose a minimum of 25 acres because we felt that smaller acreages would not be viable for a woody biofuels harvest. Of the 2,400 questionnaires mailed, 72 were undeliverable and 893 completed questionnaires were returned, for an adjusted response rate of 46%. A telephone follow-up survey was conducted with a sample of 100 people who did not respond to the mail survey to determine whether their answers to key questions differed from respondents.

Over half of the woodland owners in New York have at least some awareness of woody biofuels (66% of respondents, 52% of non-respondents). Far fewer (16%) have actually sold wood for woody biofuels. We described three groups of woodland owners: (1) those with no interest in selling woody biofuels (estimated at 38% of respondents), (2) those who have already sold woody biofuels (16%), and (3) those with an interest in selling, but who have not yet done so (46%). Considering non-response bias, the percent with no interest in selling woody biofuels is likely higher statewide, and the converse is also true, that the percent interested in selling woody biofuels is lower.

To describe the magnitude of woody biofuel intentions among family forest owners, we estimated the number of acres and owners based on the values provided through the National Woodland Owner Survey (NWOS). Respondents with no interest in selling woody biofuel, 38%, represent an estimated 42,940 owners and 2,390,820 wooded acres statewide. However, because of the non-response bias, these estimates are likely lower than what truly exists in the state. The respondents who have sold woody biofuel, 16%, represent an estimated 18,080 owners and

2,642,485 wooded acres. Respondents who are interested in selling woody biofuels, but have not yet sold represent 51,980 owners (46%) and 3,321,695 wooded acres.

Respondents who did not want to sell generally fell into two groups – those already using all wood for their own personal use, and those not interested in selling for nature or aesthetic reasons. Very few people (5%) said they didn't want to sell wood because burning woody biofuels causes air pollution.

The owners who have actually sold woody biofuels are more strongly connected with utilitarian values than those who simply express interest. Thus, the interested owners may not have sold not because they lacked opportunity, but because they have not connected the harvest with their ownership objectives. Owners who have sold are more likely to live in rural areas and fewer have college degrees. The majority sold low grade wood associated with a sawlog harvest. Thus, the owners who sold woody biomass may be more connected to and comfortable with resource extraction, they may see woody biomass harvest as an “add-on” benefit to a sawlog harvest, and may also have lower salaries that encourage a greater dependence on harvesting from their property.

Those who haven't sold but are interested represent a large audience estimated at almost 52,000 owners and 3.3 million acres in New York State. The majority live in rural areas, but the group includes a substantial urban/suburban component. They tend to have a higher education level, so materials developed can reflect that. They will seek out information from a variety of sources – written materials and the Internet may be the most effective ways to reach this group. They are particularly concerned about increased land taxes, the skill of the forester recommending the harvest, landowner liability, not receiving a fair price, and timber theft. Therefore, they are interested in learning more about the types of wood that are good, rules and regulations, tax benefits/implications, the amount of money they are likely to make, and who to contact for advice and technical assistance.

All persons and industries involved in the acquisition and use of woody biomass should consider and be able to meaningfully address the breadth of concerns shared by many owners. Most of the concerns associated with the harvest were considered of moderate to significant concern by more than half of respondents. Owners will need to have confidence or strong incentives to overcome concerns such as potential increases in land taxes, changes in their liability, fair prices, and timber theft. Further, owners are concerned about the skill of the forester, sustainability, and how the harvest might impact their other ownership objectives.

Specific Recommendations to Serve Woodland Owner Interests in Woody Biofuels

Educators:

1. Develop a broad range of educational materials, including printed (brochures, facts-sheets, workbooks, newsletters) and electronic (websites, newsletters) materials, for woodland owners and distribute those through special mailings and through consulting and NYSDEC foresters, Cooperative Extension, loggers, and trained Cornell Master Forest Owner Volunteers. For those landowners that are interested but haven't yet sold

woody biofuels, consulting foresters, CCE Educators, NYSDEC Foresters, and MFO Volunteers were noted as helpful sources of information about their decision-making.

2. Develop educational materials related to the use of woody biofuel because this provides both the potential for an expanded market and an opportunity to educate people who do not own woodland about the management process; other landowners can be a helpful source of information, especially those that have already sold biofuels that can speak with other landowners about their experiences.
3. Develop internet links to a central repository of woody biofuel based resources. Create awareness for the links and maintain the website's relevance.
4. Develop educational materials based on the identified interests of woody biofuel sellers and those landowners that are interested but have not yet sold. Experienced biofuel sellers are particularly interested in learning about finances (profit, tax implications) as well as regulations, types of wood that are good for harvest, and knowing who to contact for technical assistance and to find markets for wood. Landowners interested in woody biofuels are most interested in learning about what trees are ideal for woody biofuel harvests, rules and regulations that might impact harvesting, tax benefits and implications, and profits, as well as knowing how to contact potential buyers/processors and those that can provide technical assistance. They were also interested in learning more about the impacts of harvesting on wildlife habitat.
5. Develop networks of experienced owners and use live or virtual exposures to inform owners who may harvest of the potential risks and benefits. In some areas woodland owner cooperatives, owner associations, and trained volunteers may provide a structured venue to expose owners to experiences with the harvesting process.
6. Develop education programs that help foresters and loggers better connect with owners on a variety of management practices, emphasizing how harvesting may impact wildlife habitat, water resources, recreational uses, and scenic values of woodland .
7. Help foresters build and maintain positive and sustained relationships with their clients; foresters (both public and private) were ranked highly as helpful sources of information by both experienced and potential woody biofuel sellers.

Foresters:

1. Be familiar with the broad concerns and interests of owners (see #1-#6 above) who haven't sold, but are interested. Understand the unique perspective of each owner and help them build their confidence, as warranted, in areas of uncertainty. For both experienced and potential woody biofuel sellers, they own their land primarily for nature and aesthetic values, personal and recreational use, and family tradition.
2. Learn how to market skills for multiple management tasks to have a relationship with owners when they are ready to harvest woody biofuel or timber; experienced and potential woody biofuel sellers may be interested in a range of management activities and have multiple ownership motivations relating to recreational, aesthetic, wildlife, family tradition and to a lesser extent utilitarian values.
3. Develop marketing strategies that utilize the desired sources of information as sought by owners (see #1-#6 above). For example, have copies of brochures to share with clients, build relationships in the community, and maintain connections to former clients through direct mailings.

4. Because consulting and industrial forester and the forest products industry are generally considered important sources of assistance, work towards industry standards of biofuel best management practices that address owner concerns and are used throughout the industry.
5. Recognize that woody biofuel production is often not a primary ownership motivation of landowners and woody biofuel harvests are often conducted concurrently with sawlog harvests.

Loggers and Wood Products Industry:

1. Be familiar with the broad concerns and interests of owners who haven't previously sold trees, but are interested (see #1-#6 in "Educators" section). Communicate with the owners to understand their unique perspectives and concerns. Describe how your working techniques will lessen or avoid the likelihood for problems, especially as it relates to scenic, water, recreational, and wildlife uses of land.
2. Identify tasks that owners desire that utilize your unique skills and equipment to build a relationship with owners, expand the depth and extent of your reputation, and diversify your client base.
3. Work with educational organizations (e.g. Cooperative Extension, universities, NGO's, etc.) that connect with owners to demonstrate recent and less recent harvesting. Emphasize the advantages and disadvantages of specific harvesting techniques for different situations.
4. Be actively involved in the development and evaluation of biomass harvesting guidelines. The inclusion of practical experiences in these guides will make for a fuller and more useful document. Experienced and potential woody biofuel sellers were particularly interested in rules and regulations related to biomass harvests.

Policy Makers:

1. If ordinances are developed, recognize their impacts on community values, and the importance of owners feeling secure in the management options for their property now and into the future. State and county ordinances can have impact on land taxes, owner liability, timber theft, and regulations that restrict private property rights. These are primary concerns that owners have regarding their participation in woody biofuel production.
2. Recognize the value of woody biofuel harvesting to societal goals for energy independence, community economic vitality, and retention of rural open space.
3. Recognize that inherent limitations on the acreage likely to be harvested for biofuels based on the percentage of owners who either don't plan to ever harvest or those that plan to harvest, but not in the next 5 years.

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INTRODUCTION

Although woodlands cover more than 60% of the New York landscape, the contribution of those woodlands to renewable energy production as woody biofuel is often limited by multiple factors. Potential constraints on woody biofuel production include woodland owner attitudes about biomass harvesting and the willingness and availability of loggers and foresters to redirect their time and equipment from potentially more profitable harvests. In an attempt to better understand those constraints, Human Dimension Research Unit (HDRU) researchers teamed with Cornell Cooperative Extension personnel to study three audiences involved in supplying woody biofuels – landowners, foresters, and loggers. Knowing these constraints will support the development of educational programs that help guide the decisions of owners and producers in sustainable and renewable energy enterprises.

This report focuses on private woodland owners. In New York State, this group controls 85% of the forested land (Alerich and Drake 1995). We conducted a mail survey of a statewide random sample of woodland owners in 2010. (A companion report will address results from foresters and loggers.) Based on previous research, we felt that private woodland owners might be constrained in the production of woody biofuels because of the small size of most parcels (63% of NYS owners have parcel sizes under 10 acres) (Alerich and Drake 1995, Butler 2008), because most owners do not prioritize harvesting as an ownership objective (Connelly et al. 2007), and because harvests for low-grade wood products become profitable for the operator only if there is sufficient volume and acreage and a market for the wood.

The overarching objective of this research project is to identify and understand motivations and barriers within the woody biofuel supply system in New York State. The specific objective for the landowner portion of the project is to assess woodland owners' awareness and knowledge of woody biofuels as a crop and their potential willingness to participate in biofuel production. The outcome will be the development and dissemination of educational resources, based on our findings, that help woodland owners, foresters, loggers and policy makers make decisions about the extent and manner in which they become involved in the anticipated expansion of the woody biofuel market.

METHODS

A mail questionnaire was sent to 2,400 NYS woodland owners in the fall of 2010. The mail questionnaire was based on past research (Butler 2008, Connelly et al. 2007), and discussion by a team of Cornell Cooperative Extension educators and people involved in woody biofuels production. The questionnaire asked about 1) woodland owners' objectives for their property and past forestry experiences; 2) their awareness and knowledge of woody biofuels as a crop and their potential, current, or past willingness to participate in production, both personal and commercial; 3) factors that influence their willingness to supply woody biomass; and 4) their educational needs (see Appendix A for exact content and wording of the mail questionnaire).

In the questionnaire, woody biofuels were defined for respondents as firewood, low quality logs, wood pellets, chips, etc. that can be used to heat homes or provide energy for businesses. They

were told that these woody biofuels could come from their land directly as a result of cutting trees or from the thinning of a woodland.

The sample of 2,400 woodland owners was drawn randomly from the 2009 Assessment Rolls for New York State of parcels with 25 acres or more and property classifications that identified the land as likely wooded and not in public or industrial ownership. We chose a minimum of 25 acres because we felt that smaller acreages would not be viable for a woody biofuels harvest. Family forest parcels in New York greater than or equal to 25 acres include 8,355,000 acres and 113,000 owners (Butler et al. 2011). This population from which we drew our sample represents 74% of the family forest acreage and 18% of the owners in New York State.

Questionnaires were mailed to the sample of 2,400 in September 2010. Up to three reminder mailings (2 reminder letters and 1 additional mailing of a cover letter and an additional copy of the questionnaire) were sent to non-respondents over the course of the following month. A telephone follow-up survey was conducted with a sample of 100 people who did not respond to the mail survey to determine whether their answers to key questions differed from respondents.

Data were analyzed using SPSS (a Statistical Package for the Social Sciences). Data were analyzed primarily by grouping respondents based on their level of interest in woody biofuels. Chi-square, t-tests, and Analysis of Variance, with Scheffe's test were used to test for significant differences at the $p=0.05$ level. Factor analysis (principal components analysis with varimax rotation) and reliability tests (Cronbach's alpha) were used to categorize reasons for owning wooded property and potential concerns landowners might have when considering selling wood for woody biofuels.

RESULTS AND DISCUSSION

Mail Survey Response and Non-respondent Comparisons

Of the 2,400 questionnaires mailed, 72 were undeliverable and 893 completed questionnaires were returned, for an adjusted response rate of 46%. The first question on the survey asked if the respondent owned 25 acres or more of wooded land in New York State, because we were not certain from the property tax records whether the property contained woodlands. Twenty-seven percent indicated they did not own 25 or more acres of wooded land. They were not included in any further analysis and thus, the results reported herein are based on the 651 remaining respondents. Nonrespondents were just as likely as respondents to own 25 or more acres of wooded land, so it appears that owning little or no wooded property was not a reason for failing to respond to the survey.

Respondents and non-respondents were similar in all their socio-demographic and land ownership characteristics, and reasons for owning woodland, except for respondents being more likely to be male (84% vs. 70%) and own more acres of wooded land (mean = 116 acres vs. 77 acres). Respondents were more likely than non-respondents to have heard the term "woody biofuels" (66% vs. 52%), and be interested in selling wood from their property to be used as woody biofuels (62% vs. 47%). For those not interested in selling woody biofuels, there were no significant differences between respondents and nonrespondents in their rationales for their lack

of interest. For those interested in selling woody biofuels, respondents were more concerned than non-respondents about all four items we asked both groups about – sustainability of this type of harvesting, not receiving a fair price, landowner liability, and movement of diseases or insect pests.

Awareness of and Interest in Selling Woody Biofuels

Over half of the woodland owners in New York have at least some awareness of woody biofuels (66% of respondents, 52% of non-respondents). Far fewer (16%) have actually sold wood for woody biofuels. For the remainder of this report, we will consider three groups of woodland owners: (1) those with no interest in selling woody biofuels (estimated at 38% of respondents), (2) those who have already sold woody biofuels (16%), and (3) those with an interest in selling, but who have not yet done so (46%). Considering non-response bias, the percent with no interest in selling woody biofuels is likely higher statewide, and the converse is also true, that the percent interested in selling woody biofuels is lower.

To describe the magnitude of woody biofuel intentions among family forest owners, we estimated the number of acres and owners based on the values provided through the National Woodland Owner Survey (NWOS) (Butler et al. 2011). The NWOS estimated 8,355,000 acres and 113,000 owners in New York that matched our survey criteria. The average parcel size for owners having parcels greater than 24.9 acres is 74 acres: smaller than the average parcel size of our respondents (116 acres). However, the parcel size of our non-respondents was 77 acres, suggesting reasonable concurrence between our estimates and that of the NWOS. We should note that our sample of almost 900 returned surveys was approximately twice that of the NWOS (Butler 2008).

Our estimates of the magnitude of woody biofuel production intentions are based on the NWOS estimate of number of owners and our estimate of average parcel size is standardized by the NWOS estimate of total wooded acreage (Table 1). Respondents with no interest in selling woody biofuel, 38%, represent an estimated 42,940 owners and 2,390,820 wooded acres. However, because of the non-response bias, these estimates are likely lower than what truly exists in the state. The respondents who have sold woody biofuel, 16%, represent an estimated 18,080 owners and 2,642,485 wooded acres. Respondents who are interested in selling woody biofuels, but have not yet sold represent 51,980 owners (46%) and 3,321,695 wooded acres.

Table 1. Respondents' interest in selling woody biofuels and the characteristics of the property and responding woodland owner by level of interest.			
	Sold woody biofuels already	Interested, but haven't sold	Not interested
% of respondents in each interest group	16	46	38
Estimated # of woodland owners	18,080	51,980	42,940
Estimated # of acres	2,642,485	3,321,695	2,390,820
<i>Characteristics of the Property</i>			
Mean acres of land owned in NYS	338 ^a	194 ^b	166 ^b
Mean acres of wooded land owned in NYS	231 ^a	101 ^b	88 ^b
Median acres of wooded land owned in NYS	95	70	50
Mean # of years owned woodland	28 ^a	23 ^b	27 ^{a,b}
Mean distance in miles from closest wooded property	67	76	47
<i>Characteristics of the Responding Woodland Owner</i>			
Mean age (yrs.)	50 ^{a,b}	51 ^a	47 ^b
% Male	86.6	82.9	84.7
% living in rural area	81.4	69.4	77.6
% living in suburban area	16.5	20.6	13.3
% living in urban area	2.1	10.0	9.1
% graduated high school	92.9	98.3	95.8
% graduated college	27.6	44.2	33.3
% with graduate or professional degree	13.3	20.2	15.0
^{a,b} Values within a row with different letters are significantly different from each other at P=0.05 using Scheffe's test.			

Woodland Owners with No Interest in Selling Woody Biofuels

Woodland owners with no interest in selling woody biofuels have smaller woodlands than those who have sold woody biofuels (Table 1), but the recreational activities they enjoy on their property are not unlike other woodland owners from this survey – hunting (72%), relaxing (70%), hiking (65%), ATV riding (47%), and bird watching (44%).

We used factor analysis to identify five factors (i.e., groups of reasons) for wooded property ownership. These five factors explain 64% of the variance in reasons for owning wooded property and the scale had a relatively high reliability (Cronbach's alpha = 0.72). We found that owners with no interest in selling woody biofuels owned their wooded property primarily for nature and aesthetic values, and less so for utilitarian values (Table 2 and Appendix Table B-1). Firewood and biofuel for personal use was modestly important as a reason for owning woodland, and of low interest as a commodity to sell (Appendix Table B-1).

Table 2. Reasons for owning woodland in New York State, by interest in selling woody biofuels.			
	Sold woody biofuels already	Interested, but haven't sold	Not interested
Reasons for owning woodland	Mean Importance*		
Nature and Aesthetic Values			
To enjoy beauty or scenery	4.1	4.3	4.4
To provide wildlife with habitat	4.3	4.2	4.4
To protect nature and biological diversity	4.0	3.9	4.2
To increase the size of wildlife populations	3.8	3.6	3.7
Personal Use			
As part of my home, vacation home or farm	4.2	4.1	4.4
For privacy	4.1	4.1	4.3
For recreation, other than hunting or fishing	3.7	3.8	3.8
For production of firewood or biofuel for my family's use	3.6 ^a	3.1 ^b	3.2 ^{a,b}
Family Tradition			
To pass land on to my children or other heirs	3.8	3.6	3.6
To carry on my family tradition of owning the land	3.2	3.0	3.3
For land investment (I hope to sell all or part of my land)	2.1	2.3	2.0
Utilitarian / Forestry Values			
For hunting or fishing	3.7	3.6	3.5
For production of sawlogs, veneer, or other timber products	3.8 ^a	3.2 ^b	2.6 ^c
For production of firewood or biofuel for sale	2.9 ^a	2.4 ^b	1.5 ^c
Non-timber Utilitarian Values			
For non-timber forest products (e.g., maple syrup, mushrooms) for my family's use	2.4 ^a	1.9 ^b	2.2 ^{a,b}
For non-timber forest products for sale	1.8 ^a	1.5 ^b	1.5 ^b
*Importance was measured on a 5-point Likert-type scale where 1=not at all important to 5=very important. ^{a,b,c} Values within a row with different letters are significantly different from each other at P=0.05 using Scheffe's test.			

Almost three-quarters (72%) of respondents had harvested firewood for their own use in the past 10 years (Table 3). A majority had also marked the legal boundaries of their property and posted it against hunting. Since the majority of this group owned the land as part of the home and for privacy and beauty (Appendix Table B-1), and because they used their property for hunting, we assume the posting was to exclude others from their property, which links to the importance they placed on personal use of their property as a factor in ownership (Table 2).

Table 3. Management activities done on wooded lands in past 10 years, by interest in selling woody biofuels.			
	Sold woody biofuels already	Interested, but haven't sold	Not interested
Management Activities	Percent doing activity in past 10 years ^a		
Harvest firewood for my own use*	86.5	68.2	72.4
Mark the legal boundaries of my wooded property	69.7	58.0	59.7
Post the boundaries against hunting	61.8	56.9	59.7
Build or perform maintenance on roads or trails*	68.5	50.4	51.6
Improve timber quality by thinning or pruning*	76.4	43.1	43.0
Improve wildlife habitat	52.8	39.8	44.3
Harvest wood for sawlogs, veneer, etc.*	79.8	34.3	32.6
Improve or maintain scenic values	42.7	32.8	39.8
Plant trees*	34.8	29.9	42.1
Develop a management plan for my wooded property*	40.4	17.2	19.5
Remove invasive plant species	22.5	19.0	19.5
Harvest low-grade wood that I sell to others for processing*	57.3	12.8	10.0
Harvest firewood I process for commercial sale*	50.6	10.9	10.4
Harvest non-timber products for my own use (e.g., maple syrup)*	27.0	10.9	18.6
Reduce fire hazards	14.6	13.1	17.2
Improve fish habitat	15.7	13.9	13.6
Develop an estate/legacy plan	15.7	13.9	11.8
Improve or maintain a stream-side buffer	15.7	10.9	12.2
Apply herbicides, pesticides, or fertilizer	15.7	8.8	9.5
Establish a conservation easement on my wooded property	6.7	5.1	6.3
Harvest non-timber products for commercial sale*	10.1	2.2	2.7
^a Percentages can add to more than 100% because respondents could check more than one activity.			
*Statistically significant difference between groups at P=0.05 using chi-square test.			

In the coming five years, over one-third of respondents indicated that harvesting firewood for personal use will continue, as will posting, improving wildlife habitat, building or maintaining roads, and improving timber quality by thinning or pruning (Table 4). Additionally, 11% said they would hire a professional to harvest wood for sawlogs, veneer, etc.

Table 4. Plans for management activities on their wooded property in the next five years for those with no interest in selling woody biofuels.

Management Activities	In next 5 years:			
	I don't plan to work on this	I will work on this	Family, friends will help	I would like to hire a professional
	Percent			
Harvest firewood for my own use	59.8	26.2	13.1	0.9
Mark the legal boundaries of my wooded property	68.8	23.5	4.1	3.6
Post the boundaries against hunting	67.0	21.2	9.5	2.3
Build or perform maintenance on roads or trails	70.1	20.8	5.9	3.2
Improve timber quality by thinning or pruning	67.4	22.2	6.8	3.6
Improve wildlife habitat	67.0	26.6	4.1	2.3
Harvest wood for sawlogs, veneer, etc.	74.2	9.0	5.9	10.9
Improve or maintain scenic values	75.0	19.5	3.2	2.3
Plant trees	78.3	17.6	3.2	0.9
Develop a management plan for my wooded property	79.2	14.9	1.4	4.5
Remove invasive plant species	79.6	17.2	1.4	1.8
Harvest low-grade wood that I sell to others for processing	90.5	6.3	2.3	0.9
Harvest firewood I process for commercial sale	88.2	7.7	2.3	1.8
Harvest non-timber products for my own use (e.g., maple syrup)	83.7	9.5	6.3	0.5
Reduce fire hazards	84.1	10.4	3.2	2.3
Improve fish habitat	86.9	9.5	1.8	1.8
Develop an estate/legacy plan	79.7	15.8	0.9	3.6
Improve or maintain a stream-side buffer	89.2	7.2	1.8	1.8
Apply herbicides, pesticides, or fertilizers	90.4	7.7	0.5	1.4
Establish a conservation easement on my wooded property	90.0	7.7	1.4	0.9
Harvest non-timber products for commercial sale	91.8	5.0	1.8	1.4

When asked why they were not interested in selling wood from their land for woody biofuels, the majority (54%) said they used all wood harvested for their own personal use and 42% said they just don't want to sell wood from their property. Over one-third (39%) said they don't want to harvest wood from their property because as some respondents explained when asked for more detail "harvesting leaves a mess," they had "a bad experience with loggers," or they "want to keep the land natural." Reasons for not selling woody biofuels marked less frequently included: property too small (13%), harvesting not compatible with other uses (e.g., "maple lines to collect syrup," "protecting for wildlife") (13%), and property doesn't have the right kind of trees (e.g., "no hardwoods," "recently harvested") (6%). Very few people (5%) said they didn't want to sell wood because burning woody biofuels causes air pollution. We asked about air pollution because it was one of the most important concerns of Alachua County, Florida residents who were sent a somewhat similar survey as part of a needs assessment for outreach materials involving Cooperative Extension personnel in that state (Plate et al. 2010).

Experiences of Woodland Owners who have Sold Woody Biofuels

For the few respondents (16%) who have already sold wood for woody biofuels, the majority (64%) sold low grade wood associated with a sawlog harvest. Some sold wood from thinning that was not associated with a sawlog harvest (33%), or firewood that they processed and sold (41%). A few mentioned selling other wood products such as wood chips. (Respondents could check more than one type of wood product, so the percentages above add to more than 100%.)

In the last 10 years, 80% have harvested sawlogs or veneer, almost 60% have harvested and personally sold low-grade wood for processing, and 50% have harvested, processed and sold firewood (Table 3). The most recent harvest took place between 1990 and 2010. The average number of acres harvested at that time was 51 (median=34.5 acres), and the average number of total cords harvested was 123. More than half of the wood was sold to a logger (58%). Some was sold through a forester who administered the process (17%), or directly to a processor of woody biofuels (14%). A few people (19%) sold directly to other people such as friends or neighbors.

The majority of respondents were satisfied (44%) or very satisfied (27%) with their harvest experience. Among those who were neutral (11%) or dissatisfied (18%), the primary concern was the “mess left behind,” or “collateral damage from harvest.”

Half of the respondents (50%) thought their next woody biofuel harvest would be within the next five years. About one-quarter (24%) thought it was more than five years off, with an almost equal number (22%) unsure of the timing. Very few respondents (4%) said they would never have another woody biofuels harvest.

Woodland Owners with a Possible Interest in Selling Woody Biofuels in the Future

This group consists of both those who have sold woody biofuels in the past and those that have expressed an interest but have not yet sold any. Those with an interest but have not sold yet have smaller woodlots than those who have sold woody biofuels (Table 1). They have owned their wooded property for the same length of time on average, and live about the same distance from their closest wooded property. These landowners have participated in the same recreational activities on their land as those who have no interest in selling woody biofuels - hunting, relaxing, hiking, ATV riding, and bird watching.

While those who have sold and those with just an interest are the same age on average (Table 1), they differ in two socio-demographic characteristics that may have bearing on outreach activities. Those who have sold woody biofuels are more likely to live in rural areas (81% vs. 69%) and are less likely to have completed college (28% vs. 44%) compared to those who are interested but have not yet sold woody biofuel.

As expected, those with an interest in selling woody biofuels have more strongly held utilitarian values associated with owning wooded property than those with no interest in selling woody biofuels, but all landowners think nature and aesthetic values are important (Table 2 and Appendix Tables B-1 through B-3). Among those with an interest in selling woody biofuels,

those that have sold woody biofuels think utilitarian values such as production of sawlogs, production of biofuel for home use or sale, and non-timber products for home use are more important reasons for owning wooded land than those with just an interest in selling woody biofuels. Owners with an interest in selling woody biomass were almost twice as likely to plan to participate in commercial extractions (Table 5; e.g., non-timber forest products, sawlogs, or low grade) than were owners not interested in selling (Table 4). However, these groups were similar with regards to their plans to extract for personal use (46% and 40% planning a harvest in the next five years, respectively).

Table 5. Plans for management activities on their wooded property in the next five years for those interested, but haven't yet sold woody biofuels.

Management Activities	In next 5 years:			
	I don't plan to work on this	I will work on this	Family, friends will help	I would like to hire a professional
	Percent			
Harvest firewood for my own use	54.4	25.5	13.5	6.6
Mark the legal boundaries of my wooded property	65.3	24.1	4.0	6.6
Post the boundaries against hunting	67.8	20.8	9.9	1.5
Build or perform maintenance on roads or trails	61.6	25.2	8.8	4.4
Improve timber quality by thinning or pruning	54.0	23.4	2.9	19.7
Improve wildlife habitat	66.7	21.2	5.5	6.6
Harvest wood for sawlogs, veneer, etc.	50.0	11.3	2.6	36.1
Improve or maintain scenic values	74.1	17.5	5.1	3.3
Plant trees	71.6	20.8	2.9	4.7
Develop a management plan for my wooded property	69.0	14.6	0.7	15.7
Remove invasive plant species	77.4	15.3	1.5	5.8
Harvest low-grade wood that I sell to others for processing	68.2	8.8	1.8	21.2
Harvest firewood I process for commercial sale	75.5	8.8	2.2	13.5
Harvest non-timber products for my own use (e.g., maple syrup)	79.6	13.9	3.6	2.9
Reduce fire hazards	84.3	9.9	2.2	3.6
Improve fish habitat	81.8	10.6	3.6	4.0
Develop an estate/legacy plan	74.8	19.3	0.4	5.5
Improve or maintain a stream-side buffer	82.9	10.2	1.8	5.1
Apply herbicides, pesticides, or fertilizers	88.6	7.7	1.1	2.6
Establish a conservation easement on my wooded property	86.4	7.7	0.4	5.5
Harvest non-timber products for commercial sale	86.1	5.5	2.2	6.2

Those who had sold woody biofuels were more likely to have done a variety of activities on their property compared to those with just an interest in selling woody biofuels (suggesting the importance of previous behavior as a predictor of future behavior) (Table 3). Relevant activities included forestry-related activities such as timber stand improvement, timber harvests, and planting trees, but also trail maintenance, marking boundaries, harvesting non-timber products like maple syrup, etc. Almost all landowners who had sold woody biofuels had also harvested

firewood for their own use (87%), and they had harvested wood for sawlogs, veneer, etc. (80%). In the next five years, it appears that those who haven't sold woody biofuels plan to be more active on their woodlots than those who have sold woody biofuels (Tables 5 vs. 6). For example, 23% of those who haven't sold woody biofuels intend to remove invasive plant species, compared with 10% of those who have sold woody biofuels. The comparatively less activity planned by those who have sold woody biofuels may reflect their satisfaction with the current condition of their woodlots or negative experience of past activities. The increased activity planned by those who are interested in selling woody biofuels may reflect their lesser experience (Table 3) and thus awareness of the time and money required for certain projects. For example, those interested in selling woody biofuels seem more likely to harvest wood for sawlogs, remove invasive plants, and develop an estate plan. The one thing that those who have already sold woody biofuels are more likely to do in the future than those with just an interest is to harvest firewood that they would process for commercial sale (by themselves or with the help of others).

When asked specifically what type of wood products they might be interested in selling in the future, most of those who had already sold woody biofuels indicated they would like to sell low grade wood associated with a sawlog harvest (Table 7). They were much more likely than those with just an interest to be interested in selling firewood that they processed. Those with just an interest were less certain about what they would sell, but a majority had some interest in selling wood from a thinning, or low grade wood associated with a sawlog harvest. Educational programs for those interested, but haven't yet sold should clarify the attributes of the different types of harvesting and marketing systems.

Table 7. Type of wood products landowners would be interested in selling in the future, by whether or not they have already sold woody biofuels.		
	Sold woody biofuels already	Interested, but haven't sold
Interested in selling in the future	Percent checking ^a	
Firewood that I process and sell*	41.9	15.7
Wood from thinning, not associated with a sawlog harvest	47.7	58.7
Low grade wood associated with a sawlog harvest*	72.1	53.5
Don't know*	18.6	34.6
^a Percentages can add to more than 100% because respondents could check more than one type of wood product.		
*Statistically significant difference between groups at P = 0.05 using chi-square test.		

Landowners were asked about possible concerns they might have about selling wood for woody biofuels. To improve our understanding of their concerns, we used factor analysis to group the concerns into four factors (Table 8). These four factors explain 58% of the variance in concerns and the scale had a high reliability (Cronbach's alpha = 0.89). The factor with the items of greatest concern to the largest proportion of landowners we termed "issues with the harvest," and included such concerns as increased land taxes, landowner liability, and not receiving a fair price. The majority of respondents were moderately or very concerned about items in this factor. Those who had an interest in selling but hadn't sold yet were more concerned about landowner liability than those who have already sold wood for woody biofuels. Similarly, those with an interest were more concerned about several items in the second factor – "sustainability of woody

biofuels harvest”, which included items such as the skill of the forester recommending the harvest, and the negative impact of harvesting on wildlife or wildlife habitat. In general, items within the second factor” were of less concern to woodland owners than the first factor items. The level of concern related to the third and fourth factors, “secondary impacts,” such as movement of disease or insect pests, and “impacts on non-timber values,” was generally less across the board. Those with an interest but who hadn’t actually had a woody biofuels harvest were more concerned about the negative impacts on recreational use and scenic values than those who had a woody biofuels harvest. Air pollution from burning woody biofuels was not a concern for a plurality of respondents.

In anticipation of developing educational materials, we asked respondents what type of information they would like to have to help them make a decision about selling wood for woody biofuels. Fewer than half of those who had already sold wood were interested in any particular topic (Table 9), suggesting that they may already feel knowledgeable. In contrast, three-quarters of those who were interested but hadn’t sold any wood were interested in a variety of topics including the types of wood that are good for woody biofuel harvests, rules and regulations, and tax benefits/implications.

Table 8. Potential concerns landowners might have when considering selling wood for woody biofuels in the future, by whether or not they have already sold woody biofuels.

	Very much a concern	Moderate concern	Somewhat of a concern	Not a concern	Unsure/ Don't know
CONCERNS	Percent				
<i>Issues with the harvest</i>					
Increased land taxes					
Sold woody biofuels already	65.0	13.8	5.0	11.2	5.0
Interested, but haven't sold	68.4	10.9	5.8	5.8	9.1
Landowner liability*					
Sold woody biofuels already	53.9	17.9	11.5	14.1	2.6
Interested, but haven't sold	60.6	16.6	11.4	4.8	6.6
Not receiving a fair price					
Sold woody biofuels already	48.1	29.1	10.1	7.6	5.1
Interested, but haven't sold	59.3	22.4	10.3	2.9	5.1
Timber theft					
Sold woody biofuels already	48.1	17.7	13.9	16.5	3.8
Interested, but haven't sold	52.2	16.3	13.3	12.9	5.3
Government regulations					
Sold woody biofuels already	42.1	25.0	18.4	5.3	9.2
Interested, but haven't sold	39.3	28.3	14.3	8.7	9.4
People I don't know working on my property					
Sold woody biofuels already	40.0	17.5	12.5	25.0	5.0
Interested, but haven't sold	34.7	24.8	21.2	15.7	3.6
<i>Sustainability of woody biofuels harvest</i>					
Skill of forester recommending harvest*					
Sold woody biofuels already	55.8	16.9	10.4	14.3	2.6
Interested, but haven't sold	61.6	22.3	5.5	4.0	6.6
Sustainability of this type of harvesting on my property					
Sold woody biofuels already	50.0	27.4	5.0	16.3	1.3
Interested, but haven't sold	46.4	25.5	11.1	9.6	7.4
Negative impact on future sawlog harvest					
Sold woody biofuels already	47.4	26.9	10.3	12.8	2.6
Interested, but haven't sold	45.7	26.6	10.5	10.1	7.1
Negative impact of harvesting on wildlife or wildlife habitat*					
Sold woody biofuels already	37.1	25.9	12.3	23.5	1.2
Interested, but haven't sold	46.5	22.0	15.6	9.2	6.7
<i>Secondary impacts</i>					
Movement of diseases or insect pests					
Sold woody biofuels already	49.3	19.5	14.3	7.8	9.1
Interested, but haven't sold	44.8	22.5	16.9	7.9	7.9
Increasing problems with plants that interfere with regeneration of desirable trees					
Sold woody biofuels already	32.4	27.5	21.3	13.8	5.0
Interested, but haven't sold	39.0	29.0	15.4	9.6	7.0
Attracting more deer to my woodland					
Sold woody biofuels already	30.9	24.7	8.6	29.6	6.2
Interested, but haven't sold	35.8	20.2	11.0	29.0	4.0

Table 8. (cont.)					
	Very much a concern	Moderate concern	Somewhat of a concern	Not a concern	Unsure/ Don't know
CONCERNS	Percent				
<i>Impacts on non-timber values</i>					
Size of equipment used to harvest woody biofuels*					
Sold woody biofuels already	35.9	26.9	7.7	26.9	2.6
Interested, but haven't sold	38.5	25.1	16.4	13.5	6.5
Negative impact of harvesting on recreational uses of my land*					
Sold woody biofuels already	27.5	21.3	18.8	31.1	1.3
Interested, but haven't sold	34.7	23.1	22.8	14.2	5.2
Negative impact of harvesting on scenic values*					
Sold woody biofuels already	24.4	30.7	12.8	29.5	2.6
Interested, but haven't sold	35.3	25.2	20.7	14.3	4.5
Negative impact of harvesting on water resources					
Sold woody biofuels already	24.1	31.6	13.9	26.6	3.8
Interested, but haven't sold	30.8	23.6	16.3	21.3	8.0
Air pollution from burning woody biofuels					
Sold woody biofuels already	8.8	20.0	21.3	48.6	1.3
Interested, but haven't sold	13.7	21.3	20.9	36.5	7.6
*Statistically significant difference between groups at P = 0.05 using chi-square test.					

Table 9. Types of information needed by landowners to help them make a decision about selling wood for woody biofuels in the future, by whether or not they have already sold woody biofuels.		
Type of information needed to help make a decision about selling wood for woody biofuels	Sold woody biofuels already	Interested, but haven't sold
	Percent checking^a	
Types of wood that are good to use as woody biofuels*	36.9	76.6
Rules and regulations*	39.3	74.5
Tax benefits/implications*	42.9	73.1
Amount of money I'm likely to make*	44.0	71.7
Who to contact for advice and technical assistance (e.g., a forester)*	27.4	71.7
Who to contact to harvest/buy wood (e.g., a logger)*	32.1	58.4
Where the available/near-by processing facilities are located*	25.0	53.5
Impact of harvest on wildlife habitat*	25.0	53.5
Impact of harvest on water resources*	15.5	33.6
Impact of harvest on other recreational uses*	11.9	29.7
Impact of harvest on scenic values*	14.3	30.8
Other types of information	6.0	4.9
^a Percentages can add to more than 100% because respondents could check more than one type of information.		
*Statistically significant difference between groups at P = 0.05 using chi-square test.		

Slightly more than half of those who had already sold woody biofuels would go to Cornell Cooperative Extension personnel or someone in the forest industry (like a logger, sawmill operator, or timber buyer) if they wanted more information (Table 10). The single, most likely sources identified by respondents were consulting foresters or someone in the industry like a (logger, sawmill operator, or timber buyer). Those with an interest who hadn't sold any biofuels were likely to go to a much wider variety of sources for information. Almost three-quarters said they would seek written materials and more than half would use the Internet. Over half would seek in-person contacts with consulting foresters, NYSDEC foresters, or Cornell Cooperative Extension personnel. Slightly more than 40% would use a Cornell Cooperative Extension Master Forest Owner volunteer.

Table 10. Sources of help and information landowners would use and the one most likely to be used in the future when making a decision about selling wood for woody biofuels, by whether or not they have already sold woody biofuels.

Sources of information	Sold woody biofuels already		Interested, but haven't sold	
	Percent checking ^a	Most likely source	Percent checking ^a	Most likely source
<i>Materials / Methods</i>				
Brochures, fact-sheets, or workbooks*	46.7	4.2	73.4	13.7
Periodic newsletters*	39.1	10.4	59.2	3.9
Website*	31.5	6.3	55.0	11.8
DVD for home viewing*	22.8	2.1	47.1	2.0
Visits to demonstration areas*	26.1	2.1	43.6	1.3
Classes or workshops	21.7	0.0	32.5	2.6
Special mailing to my home*	30.4	0.0	53.6	1.3
Video clips available from Internet*	10.9	0.0	25.6	1.3
Webinar available from Internet*	5.4	0.0	15.9	0.7
E-mail listserv*	4.3	0.0	14.5	0.7
Podcast available from Internet	3.3	0.0	9.3	0.0
<i>Agencies / Organizations / People</i>				
Consulting forester*	42.4	16.7	65.4	16.3
NYS DEC forester*	31.5	8.3	56.1	14.4
Cornell Cooperative Extension personnel	51.1	6.3	57.8	11.1
Someone in the forest industry, such as a logger, sawmill operator, or timber buyer*	52.2	18.8	34.9	3.3
Other government employee*	23.9	4.2	37.4	5.2
Friends/neighbors/family members	34.8	12.5	24.6	2.0
Industry forester*	15.2	4.2	26.0	1.3
New York Forest Owners Association*	19.6	0.0	31.1	2.0
Non-profit group (e.g., Nature Conservancy)*	6.5	0.0	19.7	2.0
Cornell Master Forest Owner Volunteer*	19.6	0.0	41.9	1.3
<i>Other</i>	3.3	4.2	1.7	2.0
^a Percentages can add to more than 100% because respondents could check more than one source of information.				
*Statistically significant difference for percent checking between groups at P = 0.05 using chi-square test.				

CONCLUSIONS AND RECOMMENDATIONS FOR EDUCATIONAL PROGRAMS

Of an estimated 113,000 owners in our sample population of woodland owners having more than 25 acres (Butler et al. 2011), 43,320 (38%), controlling approximately 2.4 million acres, are not currently interested in selling woody biomass. This group controls almost 30% of the wooded parcels greater than 25 acres and provides a land base with limited likelihood of significant forest disturbance in the near future. We estimate there are 52,400 owners who control almost 3.3 million acres of woodland who are interested in selling woody biomass. The remaining 18,080 estimated owners with 2.6 million wooded acres have sold and most are willing to sell in the future.

We estimate the economic value to owners who have harvested woody biofuel (123 cords per harvest and assuming a stumpage value of \$10 per cord, DEC Stumpage Price Report) at \$12.7

million during the last 10 years, plus the increased value in the residual trees that should increase in growth. Because 57% of owners in the last 10 years sold biomass to others for processing (Table 3), and assuming an average historic value of \$25/ton delivered¹ and 2.5 tons per cord, we estimate an additional value of \$79.6 million to include gross revenue to loggers and truck drivers during the last 10-year period. The approximately 70,000 owners representing almost 6 million acres of woodland who are receptive to participation in the woody biofuel market is a significant resource, but almost one-third of owners may not be aware of the issues and opportunities surrounding woody biomass harvesting and production.

The percentage of New York woodland owners who are not interested in selling woody biofuel is a bit higher than our reported 38% due to non-response bias. Although their average parcel size is smaller, at 88 acres, they collectively represent almost 30% of the parcels included in our survey criteria. These parcels are not likely to be used for near-term commercial harvesting. People who didn't want to sell generally fell into 2 groups – those already using all wood for their own personal use, and those not interested in selling for nature or aesthetic reasons. Woodland owners who are not interested in selling woody biomass have almost one-quarter of the state's private woodland resource and are important as an educational and policy audience because their decisions will influence commodity values and non-commodity resources for all citizens. Owners who don't want to sell woody biomass are active in managing their woodlands in ways that could translate into future economic values. For example, in the next 5 years more than 30% plan to thin their woodlands, 20% plan to write a management plan, 20% plan to remove invasive plants, and 10 to 12% will harvest low-grade wood and non-timber products that they or others will process for sale. These owners are not disconnected from active management or commercial activity, but they have not seen a connection between woody biomass production and their ownership objectives, and the activities they are already undertaking on their land.

Between one-half and two-thirds of woodland owners in New York are familiar with the term woody biomass. The remaining owners are either not aware of the potential for woody biomass markets or their terminology is different from the terms used in the survey. Few people have personal experience with a woody biofuels harvest at this point. Most of those who have experience are generally satisfied. Although interest among owners for these opportunities is high, awareness of the concept and likely awareness of the issues are low. If and when markets of woody biomass develop, educational programs should first emphasize awareness of the opportunities, risks, and trade-offs associated with commercial biomass harvesting. Secondly, educational programs should help increase owner understanding of strategies to manage real and perceived concerns. Awareness might be completed through paid advertising that connect readers to websites and articles on the subject in magazines that owners read. An increased understanding for how to manage concerns can be accomplished through woodland owner conferences, webinars, field tours, and written materials. With additional training for woodland owner volunteers, groups such as Cornell's Master Forest Owner volunteers can provide an

¹ During 2010, the delivered price for woody biofuel near Ithaca, NY was approximately \$37 per ton. Using this as a basis, we use \$25/ton to represent an approximate average value for the previous 10 years. To recalculate the community value during the last 10 years with a different estimate of delivered value per ton, multiply 1,274,260 cords x 2.5 tons/cord x the historic average value per ton.

important and credible bridge for owners who might become involved with woody biomass harvesting.

Concerns have arisen among virtually all segments of the woody biomass supply chain and industry related to the ecological impacts of woody biomass harvesting. Although foresters have the potential to position themselves as an unbiased and objective representative of the owner's interests, they have been involved in only 17% of the woody biomass harvests. Almost three-quarters of harvests happen directly with a logger or the end user. Educational materials that address harvesting concerns should be prioritized for the logger community, but not to the exclusion of educational materials for foresters. If foresters want to play a more active role in woody biomass harvests, they may need to more fully and actively articulate the objective values they provide to woodland owners. Foresters have the skill set to reduce the dissatisfaction owners felt for the "mess left behind" and "collateral damage." Given the broad array of activities planned by owners, foresters should build relationships that foster their involvement with all land management activities.

A progression of behavior from those uninterested in harvesting to those interested in harvesting would have implications for the amount of woody biomass available, but also potentially the need for different management strategies to accommodate the attitudes of the currently uninterested owners and their smaller properties. The results of our survey offer modest support to think about the three groups as a progression of behaviors from those not interested in selling to those interested and finally those who have sold. However, evidence of significant deviance from this pattern is also apparent. Support for a progression rests largely on the increasing percentage of owner activities, completed or planned, that relate to enhancements in the commercial value of the property (Tables 3 through 6). For some prior management activities (Table 3), there is little difference between owners who are not interested and those who are interested, but haven't sold woody biomass. The contrast with the apparent pattern is reflected in the reasons for ownership of woodland property (Table 2), particularly the utilitarian and forestry values. In the short-term, the potential for progression seems unlikely. However, if the owners who are not interested in selling experience shifts in their employment status, age, family needs, or other factors that influence their motivations for ownership they might be more inclined to participate in woody biomass production.

The educational and policy ramifications of the differences between owners who have sold and those interested in selling woody biomass are subtle, but relevant. The owners who have sold are more strongly connected with utilitarian values. Thus, the interested owners may not have sold not because they lacked opportunity, but because they have not connected the harvest with their ownership objectives. Owners who have sold are more rural and fewer have college degrees. The majority sold low grade wood associated with a sawlog harvest. Thus, the owners who sold woody biomass may be more connected to and comfortable with resource extraction (Table 2), they may see woody biomass harvest as an "add-on" benefit to a sawlog harvest, and may also have lower salaries that encourage a greater dependence on harvesting from their property. Because those who have sold and those interested in selling woody biomass both think nature and aesthetic values are important, educational materials should address the effects of woody biomass harvesting on these values and issues associated with the harvest. Further, educational materials should target strategies that foresters and loggers can use to alleviate concerns about issues with the harvest (Table 8) and accomplish production, aesthetic and nature objectives

(Appendix Table B-2 and B-3). Woody biomass harvesting is integral to the economy of the wood products industry and the stability of many rural communities. Owners who have sold have strong interest in future sales (Table 7). Those owners interested in selling woody biomass are receptive to the opportunities, but less certain about how they can best take advantage of the opportunities (Table 7).

Those who haven't sold but are interested have distinct characteristics and represent a large audience estimated at almost 52,000 owners and 3.3 million acres. The majority live in rural areas, but the group includes a substantial urban/suburban component. They tend to have a higher education level, so materials developed can reflect that. They will seek out information from a variety of sources – written materials and the Internet may be the most effective ways to reach the largest segment of this group. They are particularly concerned about increased land taxes, the skill of the forester recommending the harvest, landowner liability, not receiving a fair price, and timber theft. Therefore, they are interested in learning more about the types of wood that are good, rules and regulations, tax benefits/implications, the amount of money they are likely to make, and who to contact for advice and technical assistance.

All persons and industries involved in the acquisition and use of woody biomass should consider and be able to meaningfully address the breadth of concerns shared by many owners (Table 8). Most of the concerns associated with issues of the harvest were considered of moderate to significant concern by more than half the owners. Owners will need to have confidence or strong incentives to overcome concerns such as potential increases in land taxes, changes in their liability, fair prices, and timber theft. Further, owners are concerned about the skill of the forester, sustainability, and how the harvest might impact their other ownership objectives. Educational materials should address the likelihood and management of these concerns. Local community networks of professionals, written materials and websites are all viable strategies to connect with owners interested in selling woody biofuels. Owners who are interested, but haven't sold, will seek information on a broad range of topics (Table 9).

Neither those owners who sold or those owners who are interested in selling woody biomass recognized the negative impacts of deer or interfering plants as a prominent concern (Table 8). However, these two concerns were prioritized in a recent survey of foresters regarding limitations to forest regeneration (Connelly et al. 2010) and in other recent work on forest regeneration (Shirer and Zimmerman 2010). More than two-thirds of these owners have completed activities in their woodland (Table 3, e.g., cutting firewood, building roads and trails, selling timber) that could encourage natural regeneration, and thus set the stage for a negative interaction with deer and interfering plants. The interactions of deer and interfering vegetation with sustainable goals should be addressed within this context and in the context of the future role for woody biomass harvesting. Educational programs should highlight these interactions and include owner, forester, and policy audiences.

Concerns with biofuel harvesting (Table 8) are either increased or diminished through experience, suggesting the value of observational learning. Owners who had sold woody biomass are slightly, but not significantly, more concerned about government regulation and the spread of disease and insects (Table 8). It is unclear if the act of selling heightened the awareness of these owners for these concerns, or if their involvement in selling was related to a

predisposition to these concerns. Those who are interested, but haven't yet sold, had broader concerns that may reflect their uncertainty about harvesting, in general, as an activity with which they have comparatively less experience (Table 3).

The comparatively low interest in educational assistance among owners who have sold, relative to those who are interested in selling woody biomass (Table 9), cannot be explained based on our survey. The disparity is interesting given the similarity of many of their concerns (Table 8). Owners who have sold may feel their experience has provided the necessary knowledge for subsequent activity, or their plan to use industry personnel, a supposition supported by their inclination to use someone in the forest industry or a consulting forester for information and assistance (Table 10). Owners who haven't sold but are interested have a stronger formal educational base than those who have sold (Table 1) and thus may be fundamentally more inclined towards using educational resources as part of decision making. These owners may be particularly interested in written materials and websites (Table 10). The broader desire for information and assistance (Table 10) among owners who are interested in selling woody biomass is consistent with the greater variety of interests in the next 5 years (Table 5). The preference for owners who have sold and want to sell woody biomass for assistance from consulting and industrial foresters suggests a need for foresters to be knowledgeable about markets and biomass harvesting practices.

The three owner categories modestly indicate they will seek professional assistance on a variety of activities in the next five years, but fewer than half of the owners who harvest trees indicate they will seek assistance with timber harvests (Tables 4, 5, and 6). Of the owners not interested in selling woody biomass, approximately 10% indicate they will seek assistance from a forester with a sawtimber or veneer sale compared to almost 15% who plan to complete this task alone or with family (Table 4). Of owners who have or would like to sell woody biomass, most do not plan to sell in the next five years (Tables 4 and 5). Of those who plan a harvest, 15 to 20% do not plan to seek professional assistance and 20 to 30% plan to seek professional assistance. The interest by owners in professional assistance suggests two important educational needs. First, foresters need to identify and market a range of services that are broader than timber sale assistance, to include services such as management plan development, guidance on thinning, estate planning, boundary line marking, developing conservation easements, and controlling invasive species. Building a relationship with owners through these services will demonstrate capacity and familiarity that may result in greater forester involvement in commercial harvests. Second, educational programs for woodland owners should articulate the values associated with using a forester, and how to select a competent forester when conducting harvesting activities. Of owners who had previous woody biomass sales, only 17% used a forester to administer the sale. This indicates that owners have not recognized the value that a forester can bring to a harvest.

Woody biomass harvesting has implications for the owner's enjoyment of his or her property and the sustainability of commodity and non-commodity woodland values, yet few owners seek professional assistance (Tables 4, 5, and 6). New York woodland owners have not historically sought advice. Slightly fewer than one-quarter of owners have sought any advice (Butler et al. 2011), and of owners who sought advice during a recent timber sale, approximately 40% sought that advice from a state or private sector forester. These estimates are comparable to our

estimate of 17% of owners using a forester during their recent woody biomass harvest. To the extent foresters are willing and able to use their talents to represent owners' values, they will need to be better connected with the owners prior to harvesting. Similarly, loggers want to ensure the longevity of the forest resource (unpublished data from this project) and will want to learn appropriate biomass harvesting strategies. Between 17 and 40% of owners we surveyed (Table 3) have developed management plans in the last 10 years. This suggests a higher level of management plan development than is apparent from national surveys (Butler et al. 2011) where 6% of NY woodland owners having more than 25 acres have a written plan and 8% of those who have had a harvest have a plan.

Specific Recommendations to Serve Woodland Owner Interests in Woody Biofuels

Educators:

1. Develop a broad range of educational materials, including printed (brochures, facts-sheets, workbooks, newsletters) and electronic (websites, newsletters) materials, for woodland owners and distribute those through special mailings and through consulting and NYSDEC foresters, Cooperative Extension, loggers, and trained Cornell Master Forest Owner Volunteers. For those landowners that are interested but haven't yet sold woody biofuels, consulting foresters, CCE Educators, NYSDEC Foresters, and MFO Volunteers were noted as helpful sources of information about their decision-making.
2. Develop educational materials related to the use of woody biofuel because this provides both the potential for an expanded market and an opportunity to educate people who do not own woodland about the management process; other landowners can be a helpful source of information, especially those that have already sold biofuels that can speak with other landowners about their experiences.
3. Develop internet links to a central repository of woody biofuel based resources. Create awareness for the links and maintain the website's relevance.
4. Develop educational materials based on the identified interests of woody biofuel sellers and those landowners that are interested but have not yet sold. Experienced biofuel sellers are particularly interested in learning about finances (profit, tax implications) as well as regulations, types of wood that are good for harvest, and knowing who to contact for technical assistance and to find markets for wood. Landowners interested in woody biofuels are most interested in learning about what trees are ideal for woody biofuel harvests, rules and regulations that might impact harvesting, tax benefits and implications, and profits, as well as knowing how to contact potential buyers/processors and those that can provide technical assistance. They were also interested in learning more about the impacts of harvesting on wildlife habitat.
5. Develop networks of experienced owners and use live or virtual exposures to inform owners who may harvest of the potential risks and benefits. In some areas woodland owner cooperatives, owner associations, and trained volunteers may provide a structured venue to expose owners to experiences with the harvesting process.
6. Develop education programs that help foresters and loggers better connect with owners on a variety of management practices, emphasizing how harvesting may impact wildlife habitat, water resources, recreational uses, and scenic values of woodland.

7. Help foresters build and maintain positive and sustained relationships with their clients; foresters (both public and private) were ranked highly as helpful sources of information by both experienced and potential woody biofuel sellers.

Foresters:

1. Be familiar with the broad concerns and interests of owners (see #1-#6 above) who haven't sold, but are interested. Understand the unique perspective of each owner and help them build their confidence, as warranted, in areas of uncertainty. For both experienced and potential woody biofuel sellers, they own their land primarily for nature and aesthetic values, personal and recreational use, and family tradition.
2. Learn how to market skills for multiple management tasks to have a relationship with owners when they are ready to harvest woody biofuel or timber; experienced and potential woody biofuel sellers may be interested in a range of management activities and have multiple ownership motivations relating to recreational, aesthetic, wildlife, family tradition and to a lesser extent utilitarian values.
3. Develop marketing strategies that utilize the desired sources of information as sought by owners (see #1-#6 above). For example, have copies of brochures to share with clients, build relationships in the community, and maintain connections to former clients through direct mailings.
4. Because consulting and industrial forester and the forest products industry are generally considered important sources of assistance, work towards industry standards of biofuel best management practices that address owner concerns and are used throughout the industry.
5. Recognize that woody biofuel production is often not a primary ownership motivation of landowners and woody biofuel harvests are often conducted concurrently with sawlog harvests.

Loggers and Wood Products Industry:

1. Be familiar with the broad concerns and interests of owners who haven't previously sold trees, but are interested (see #1-#6 in "Educators" section). Communicate with the owners to understand their unique perspectives and concerns. Describe how your working techniques will lessen or avoid the likelihood for problems, especially as it relates to scenic, water, recreational, and wildlife uses of land.
2. Identify tasks that owners desire (Tables 4 and 5) that utilize your unique skills and equipment to build a relationship with owners, expand the depth and extent of your reputation, and diversify your client base.
3. Work with educational organizations (e.g. Cooperative Extension, universities, NGO's, etc.) that connect with owners to demonstrate recent and less recent harvesting. Emphasize the advantages and disadvantages of specific harvesting techniques for different situations.
4. Be actively involved in the development and evaluation of biomass harvesting guidelines. The inclusion of practical experiences in these guides will make for a fuller and more useful document. Experienced and potential woody biofuel sellers were particularly interested in rules and regulations related to biomass harvests.

Policy Makers:

1. If ordinances are developed, recognize their impacts on community values, and the importance of owners feeling secure in the management options for their property now and into the future. State and county ordinances can have impact on land taxes, owner liability, timber theft, and regulations that restrict private property rights. These are primary concerns that owners have regarding their participation in woody biofuel production.
2. Recognize the value of woody biofuel harvesting to societal goals for energy independence, community economic vitality, and retention of rural open space.
3. Recognize that inherent limitations on the acreage likely to be harvested for biofuels based on the percentage of owners who either don't plan to ever harvest or those that plan to harvest, but not in the next 5 years.

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APPENDIX A
Study Questionnaire

**A SURVEY OF NEW YORK STATE
WOODLAND OWNERS
AND THEIR INTEREST IN WOODY BIOFUELS**

Research conducted by the
Human Dimensions Research Unit
Department of Natural Resources
Cornell University

The purpose of this survey is to learn more about why you own forest land, what if anything you do on your wooded property, and if you have any interest in harvesting woody biofuels from your property. Woody biofuels are firewood, low quality logs, wood pellets, chips, etc. that can be used to heat homes or provide energy for businesses. Landowners will benefit from your participation in this survey because the results will help Cornell Cooperative Extension and its partners develop new educational materials, services and programs to help landowners who are considering harvesting woody biofuels from their property. If you have no interest in woody biofuels, we ask that you answer just a few questions and return the questionnaire to us so we can gauge interest statewide.

Your name was randomly selected from landowners who owned more than 25 acres of potentially wooded land listed on the New York State property tax rolls. If you do not own 25 or more acres of wooded property in New York State, please answer just the first question and return the survey to us, so that we do not bother you with reminder mailings.

Please complete this questionnaire at your earliest convenience, seal it with the white resealable label provided, and drop it in any mailbox; return postage has been provided. Your participation in this survey is voluntary, but we sincerely hope you will take just a few minutes to answer our questions. Your identity will be kept confidential and the information you give us will never be associated with your name.

THANK YOU FOR YOUR HELP!

1. Do you own 25 or more acres of woodland in New York State?

☐ No → Thank you for your time. Please seal this questionnaire and return it to us, so we don't bother you with unnecessary reminder letters.

☐ Yes → Continue with Question 2.

2. How many acres of land do you own in New York State and how many of those acres are wooded?

_____ total acres owned

_____ acres of wooded land

3. How long have you owned your woodland?

_____ number of years

4. How far do you live from your closest wooded property?

_____ live on or within 1 mile of my wooded property

_____ number of miles from wooded property

5. Which of the following recreational activities have you (or your household members) done on your woodland in the past year? (Check ALL that apply.)

☐ Hunting

☐ Fishing

☐ Bird watching

☐ Skiing / snowshoeing

☐ Hiking

☐ Snowmobiling

☐ Nature study

☐ ATV riding

☐ Relaxing

☐ Horseback riding

6. People own woodland for many reasons. How important are the following as reasons for why you own woodland in New York? (Check one box for each reason.)

How important are the following as reasons for why you own woodland in New York?	Not at all important	Slightly important	Somewhat important	Moderately important	Very important
To enjoy beauty or scenery	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To protect nature and biological diversity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To provide wildlife with habitat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To increase the size of wildlife populations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For land investment (I hope to sell all or part of my land)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
As part of my home, vacation home, or farm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For privacy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To pass land on to my children or other heirs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To carry on my family tradition of owning the land	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For non-timber forest products (e.g., maple syrup, mushrooms) for my family's use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For non-timber forest products (e.g., maple syrup, mushrooms) for sale	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For production of firewood or biofuel for my family's use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For production of firewood or biofuel for sale	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For production of sawlogs, veneer, or other timber products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For hunting or fishing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For recreation, other than hunting or fishing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (please specify): _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. The following are activities some landowners do on their woodland. Please indicate if you have done (or had someone do) each of the following on your woodland in the past 10 years. ALSO, if you plan to do any of the following activities on your woodland in the next 5 years, please check whether you think you will work on them yourself, have help from friends or family, or hire a professional. (Check ALL that apply.)

Activities	Have done in past 10 years?	In next 5 years:		
		I will work on this	Family, friends will help	I would like to hire a professional
Harvest firewood for my own use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Harvest firewood I process for commercial sale	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Harvest low grade wood that I sell to others for processing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Harvest wood for sawlogs, veneer, etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Harvest non-timber products for my own use (e.g., maple syrup)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Harvest non-timber products for commercial sale	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Apply herbicides, pesticides, or fertilizers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Remove invasive plant species	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improve timber quality by thinning or pruning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Plant trees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improve wildlife habitat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improve fish habitat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improve or maintain a stream-side buffer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improve or maintain scenic values	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mark the legal boundaries of my wooded property	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Post the boundaries against hunting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reduce fire hazards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Build or perform maintenance on roads or trails	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Develop a management plan for my wooded property	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Establish a conservation easement on my wooded property	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Develop an estate/legacy plan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8. Before receiving this survey had you heard the term “woody biofuels?”

- ☐ No
☐ Yes

When we say “woody biofuels” in this survey we mean any woody material that is used to produce energy, such as firewood or wood pellets. These woody biofuels could come from your land directly as a result of cutting trees or from thinning of a woodland.

If you have sold wood for woody biofuels, please skip to Question 10.

If you think you might be interested in selling wood from your property in the future to be used as woody biofuels, skip to Question 15.

If you are not interested in selling wood from your land to be used for woody biofuels, continue with Question 9 below.

9. Are any of the following reasons why you are not interested in selling wood from your land to be used for woody biofuels? (Check ALL that apply.)

☐ Don’t want to harvest wood from my property (Please describe why in more detail:

_____)

- ☐ Don’t want to sell wood from my property
☐ Use all wood harvested for my own personal use
☐ My property is too small
☐ My property doesn’t have the right kind of trees to be used for woody biofuels (What led you to think this? _____
_____)
☐ Harvesting is not compatible with other uses of my wooded property (Please specify other uses: _____)
☐ Burning woody biofuels causes air pollution
☐ Other reasons (Please describe: _____
_____)

Please skip to the back page and answer Questions 19 through 22.

10. What type of wood products did you sell in your most recent woody biofuels harvest? (Check ALL that apply.)

- ☐ Firewood that I processed and sold
☐ Wood from thinning, not associated with a sawlog harvest
☐ Low grade wood associated with a sawlog harvest
☐ Other (Please describe: _____)

11. Please describe your most recent harvest of woody biofuels?

_____ # of acres

_____ # of cords removed

_____ Year when most recent harvest took place

12. Who did you sell to? (Check ALL that apply.)

- ☐ Logger
☐ Directly to a processor of woody biofuels
☐ Worked through a forester to administer process
☐ Other (Please describe: _____)

13a. What was your experience with the harvest? (Check ONE box.)

- | | |
|--|---|
| <input type="checkbox"/> Very dissatisfied | <input type="checkbox"/> Satisfied |
| <input type="checkbox"/> Dissatisfied | <input type="checkbox"/> Very satisfied |
| <input type="checkbox"/> Neutral | |

13b. Did you have any concerns about the harvest? _____

14. When do you expect the next harvest that will include woody biofuels? (Check ONE box.)

- ☐ 5 years or less
☐ More than 5 years
☐ Never
☐ Don’t know

15. What type of wood products might you be interested in selling in the future? *(Check ALL that apply.)*

- ☐ Firewood that I process and sell
- ☐ Wood from thinning, not associated with a sawlog harvest
- ☐ Low grade wood associated with a sawlog harvest
- ☐ Don't know

16. What type of information do you need to help you make a decision about selling wood for woody biofuels in the future? *(Check ALL that apply.)*

- ☐ Types of wood that are good to use as woody biofuels
- ☐ Who to contact for advice and technical assistance (e.g., a forester)
- ☐ Who to contact to harvest/buy wood (e.g., a logger)
- ☐ Amount of money I'm likely to make
- ☐ Tax benefits / implications
- ☐ Rules and regulations
- ☐ Where the available/ nearby processing facilities are located
- ☐ Impact of harvest on wildlife habitat
- ☐ Impact of harvest on water resources
- ☐ Impact of harvest on other recreational uses
- ☐ Impact of harvest on scenic values
- ☐ Other types of information (Please describe:

 _____)

17. How much of a concern are each of the following to you as you consider selling wood for woody biofuels in the future? *(Check one box for each concern.)*

	Not a concern at all	Somewhat of a concern	A moderate concern	Very much a concern	Unsure \ Don't know
Concerns					
Negative impact of harvesting on wildlife or wildlife habitat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sustainability of this type of harvesting on my property	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Negative impact of harvesting on recreational uses of my land	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Movement of diseases or insect pests	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
People I don't know working on my property	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Landowner liability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Negative impact of harvesting on water resources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Size of equipment used to harvest woody biofuels	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Negative impact of harvesting on scenic values	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Government regulations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Negative impact on future sawlog harvest	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Skill of forester recommending harvest	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Increased land taxes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Timber theft	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not receiving a fair price	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Attracting more deer to my woodland	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Increasing problems with plants that interfere with regeneration of desirable trees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air pollution from burning woody biofuels	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (please specify): _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18a. Which of the following sources of help and information would you use in the future to help you decide if you wanted to sell wood from your land for woody biofuels. (Check ALL that apply.)

Source of information	Likely use in the future?
Brochures, fact-sheets, or workbooks	<input type="checkbox"/>
Periodic newsletters	<input type="checkbox"/>
Special mailing to my home	<input type="checkbox"/>
Classes or workshops	<input type="checkbox"/>
Visits to demonstration areas	<input type="checkbox"/>
Website	<input type="checkbox"/>
Podcast available from Internet	<input type="checkbox"/>
Webinar available from Internet	<input type="checkbox"/>
Video clips available from Internet	<input type="checkbox"/>
E-mail listserv	<input type="checkbox"/>
DVD for home viewing	<input type="checkbox"/>
Consulting forester	<input type="checkbox"/>
Industry forester	<input type="checkbox"/>
NY Department of Environmental Conservation (DEC) forester	<input type="checkbox"/>
Other govt. employee (e.g., Soil and Water Conservation District, Farm Service Agency, NRCS)	<input type="checkbox"/>
Cornell Cooperative Extension personnel	<input type="checkbox"/>
Cornell Master Forest Owner Volunteer	<input type="checkbox"/>
New York Forest Owners Association	<input type="checkbox"/>
Non-profit group (e.g., Nature Conservancy)	<input type="checkbox"/>
Someone in the forest industry, such as a logger, sawmill operator, or timber buyer	<input type="checkbox"/>
Friends / neighbors / family members	<input type="checkbox"/>
Other (Please specify: _____ _____)	<input type="checkbox"/>

18b. Please circle the 1 source above that you would be most likely to use in the future.

BACKGROUND INFORMATION

19. Are you male or female? (Check one.)

☐ Male ☐ Female

20. In what year were you born? 19_____

21. Is your primary residence: (Check one.)

☐ Urban ☐ Suburban ☐ Rural

22. What is the highest level of formal education you have completed? (Check one.)

- ☐ Less than high school
- ☐ High school diploma / G.E.D.
- ☐ Some college or technical school
- ☐ Associate's Degree
- ☐ College undergraduate degree (e.g., B.A., B.S.)
- ☐ Graduate or professional degree (e.g., M.S., Ph.D., M.D., J.D.)

Please use the space below for any comments you wish to make or questions you'd like to ask. We will post the results of the survey and try to answer questions in the "Woodlot Management" section of www.ForestConnect.info/forum.

Thank you for your time and effort!

To return this questionnaire, simply seal it with the white removable seal, and drop it in the mail (return postage has been provided).

APPENDIX B
Additional Tables

Table B-1. Reasons for owning woodland in New York State, for those with no interest in selling woody biofuels.			
Reasons for owning woodland	Mean Importance*	Moderately Important	Very Important
		Percent	
Nature and Aesthetic Values			
To enjoy beauty or scenery	4.4	16.8	64.5
To provide wildlife with habitat	4.4	20.4	61.1
To protect nature and biological diversity	4.2	21.6	53.2
To increase the size of wildlife populations	3.7	17.0	43.4
Personal Use			
As part of my home, vacation home or farm	4.4	10.9	71.8
For privacy	4.3	14.2	65.3
For recreation, other than hunting or fishing	3.8	20.5	45.6
For production of firewood or biofuel for my family's use	3.2	16.9	32.9
Family Tradition			
To pass land on to my children or other heirs	3.6	11.8	45.5
To carry on my family tradition of owning the land	3.3	12.1	39.5
For land investment (I hope to sell all or part of my land)	2.0	6.5	11.1
Utilitarian / Forestry Values			
For hunting or fishing	3.5	15.7	41.3
For production of sawlogs, veneer, or other timber products	2.6	14.5	15.9
For production of firewood or biofuel for sale	1.5	6.5	2.3
Non-timber Utilitarian Values			
For non-timber forest products (e.g., maple syrup, mushrooms) for my family's use	2.2	13.2	8.5
For non-timber forest products for sale	1.5	2.3	2.8
*Importance was measured on a 5-point Likert-type scale where 1=not at all important to 5=very important.			

Table B-2. Reasons for owning woodland in New York State, for those who have sold woody biofuels already.			
Reasons for owning woodland	Mean Importance*	Moderately Important	Very Important
		Percent	
Nature and Aesthetic Values			
To enjoy beauty or scenery	4.1	18.6	55.8
To provide wildlife with habitat	4.3	22.0	58.5
To protect nature and biological diversity	4.0	17.6	50.6
To increase the size of wildlife populations	3.8	19.0	45.2
Personal Use			
As part of my home, vacation home or farm	4.2	12.2	67.1
For privacy	4.1	14.0	57.0
For recreation, other than hunting or fishing	3.7	12.5	46.6
For production of firewood or biofuel for my family's use	3.6	27.1	31.8
Family Tradition			
To pass land on to my children or other heirs	3.8	21.8	40.2
To carry on my family tradition of owning the land	3.2	18.8	32.9
For land investment (I hope to sell all or part of my land)	2.1	7.1	9.4
Utilitarian / Forestry Values			
For hunting or fishing	3.7	14.6	47.2
For production of sawlogs, veneer, or other timber products	3.8	29.9	36.8
For production of firewood or biofuel for sale	2.9	22.1	17.4
Non-timber Utilitarian Values			
For non-timber forest products (e.g., maple syrup, mushrooms) for my family's use	2.4	13.8	11.5
For non-timber forest products for sale	1.8	5.7	6.9
*Importance was measured on a 5-point Likert-type scale where 1=not at all important to 5=very important.			

Table B-3. Reasons for owning woodland in New York State, for those interested, but haven't yet sold woody biofuels.			
Reasons for owning woodland	Mean Importance*	Moderately Important	Very Important
		Percent	
Nature and Aesthetic Values			
To enjoy beauty or scenery	4.3	21.1	58.9
To provide wildlife with habitat	4.2	24.0	53.2
To protect nature and biological diversity	3.9	22.8	43.7
To increase the size of wildlife populations	3.6	18.5	35.8
Personal Use			
As part of my home, vacation home or farm	4.1	17.0	59.0
For privacy	4.1	22.1	52.0
For recreation, other than hunting or fishing	3.8	28.2	37.8
For production of firewood or biofuel for my family's use	3.1	17.0	26.9
Family Tradition			
To pass land on to my children or other heirs	3.6	16.8	40.3
To carry on my family tradition of owning the land	3.0	13.2	31.6
For land investment (I hope to sell all or part of my land)	2.3	14.9	10.0
Utilitarian / Forestry Values			
For hunting or fishing	3.6	16.8	41.2
For production of sawlogs, veneer, or other timber products	3.2	26.0	23.4
For production of firewood or biofuel for sale	2.4	14.7	10.6
Non-timber Utilitarian Values			
For non-timber forest products (e.g., maple syrup, mushrooms) for my family's use	1.9	7.1	5.6
For non-timber forest products for sale	1.5	3.4	3.8
*Importance was measured on a 5-point Likert-type scale where 1=not at all important to 5=very important.			